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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/660,477	09/12/2003	Richard A. Haight	20140-00303-US1	6311

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EXAMINER

EVANS, GEOFFREY S

ART UNIT	PAPER NUMBER
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1725

DATE MAILED: 06/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/660,477

Applicant(s)

HAIGHT ET AL.

Examiner

Geoffrey S. Evans

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 March 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-42 and 44-52 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-37 and 40-42 is/are allowed.
- 6) ☒ Claim(s) 38,39,44-52 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

DETAILED ACTION

1. The indicated allowability of the subject matter of claims 44-46 in the last office action is withdrawn in view of the prior art references subsequently discovered.
2. Claims 38-39 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 38 and 39 depend upon claims 1,9 (indirectly through claim 15),16 and 23. Claims 1,9,16 and 23 all recite that the laser pulses are extreme ultraviolet or EUV. The instant specification discloses (see paragraph 44) that 157 nm is merely deep ultraviolet (DUV) and not extreme ultraviolet (EUV). Therefore claims 38 and 39 contradict and confusingly broaden the subject matter in claims 1,9,16 and 23.
3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.
4. Claims 44,47,48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zait in U.S. Patent Application Publication No. 2005/0084767 in view of Cheng et al. in U.S. Patent Application Publication No. 2002/0172235 A1 and Miyazaki et al. in the article "High-Order Harmonic Generation in the Soft X-ray to XUV by ultrashort Laser Pulses". Zait et al. discloses an apparatus for repairing a defect on a photomask comprising a laser (element 1) capable of providing a femtosecond pulse width laser

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light (see paragraph 74), a harmonics generator (see paragraph 75), an objective lens (see paragraph 78), and a control unit (variable attenuator 3, see paragraph 75). Zait et al. does not disclose that the harmonics generator is a harmonic conversion cell, nor does Zait et al. disclose using a filter. Miyazaki et al. teaches using a harmonic conversion cell with a rare gas to allow tuning of the wavelength as low as 7.6 nm, so Miyazaki is capable of tuning to 13 nm. Cheng et al. further teaches using a filter (see figure 7) to filter out undesired wavelengths. It would have been obvious to adapt Zait et al. in view of Cheng et al. and Miyazaki et al. to provide this to permit tuning of the wavelength to the material in the mask to increase ablation efficiency.

5. Claims 45, 49, and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zait in U.S. Patent Application Publication No. 2005/0084767 in view of Cheng et al. in U.S. Patent Application Publication No. 2002/0172235 A1, and Yamada et al. in U.S. Patent No. 2003/0213770 A1. Zait et al. (767) disclose an apparatus for repairing a defect on a photomask comprising a laser (element 1) capable of providing a femtosecond pulse width laser light (see paragraph 74), a harmonics generator (see paragraph 75), an objective lens (see paragraph 78), and a control unit (variable attenuator 3, see paragraph 75). Zait et al. (767) does not disclose that the harmonics generator is a harmonic conversion cell, nor does Zait et al. (767) disclose using a filter. Chang et al. teaches using a harmonic conversion cell with a rare gas to allow tuning of the wavelength (e.g. see paragraph 32), Cheng et al. further teaches using a filter (see figure 7) to filter out undesired wavelengths. Yamada et al. teaches that it is known to use a 157 nm for laser processing (see paragraph 10) and using a laser with an output

of 800nm (see paragraph 94) . It would have been obvious to adapt Zait et al. in view of Cheng et al., and Yamada et al. to provide this to be able to select the harmonic permit tuning of the wavelength to 157 nm to achieve the same characteristics as the fundamental wavelength of the F₂ excimer laser while having ultrashort laser pulses to prevent undesired thermal effects.

6. Claims 46,51, and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zait in U.S. Patent Application Publication No. 2005/0084767 in view of Cheng et al. in U.S. Patent Application Publication No. 2002/0172235 A1 and Zait et al. in U.S. 2002/0086245 A1. Zait et al. (767) discloses an apparatus for repairing a defect on a photomask comprising a laser (element 1) capable of providing a femtosecond pulse width laser light (see paragraph 74), a harmonics generator (see paragraph 75), an objective lens (see paragraph 78), and a control unit (variable attenuator 3, see paragraph 75). Zait et al.(767) does not disclose that the harmonics generator is a harmonic conversion cell, nor does Zait et al.(767) disclose using a filter. Chang et al. teaches using a harmonic conversion cell with a rare gas to allow tuning of the wavelength (e.g. see paragraph 32), Cheng et al. further teaches using a filter (see figure 7) to filter out undesired wavelengths. Zait et al. (245) teaches using ultrashort laser pulses (femtoseconds, see paragraph 31) and using the ArF laser which has a first harmonic wavelength of 193 nm wavelength (see paragraph 100) to manufacture a reticle (mask). It would have been obvious to adapt Zait et al.(767) in view of Cheng et al. and Zait et al. (245) to provide this to permit tuning of the wavelength to the material in the mask to increase ablation efficiency.

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7. Applicant's arguments with respect to claims of record have been considered but are moot in view of the new ground(s) of rejection.

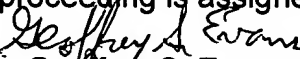
8. Claims 1-37,40-42 are allowed.

9. Claims 38 and 39 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Geoffrey S Evans whose telephone number is (571)-272-1174. The examiner can normally be reached on Mon-Fri 6:30AM to 4:00 PM, alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on (571)-272-1292. The fax phone number for the organization where this application or proceeding is assigned is (571)-273-8300.

GSE


Geoffrey S. Evans
Primary Examiner
Group 1700